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MATERIAL LANGUAGE STYLES AND THEIR IMPLICATIONS FOR CHILDREN'S COGNITIVE DEVELOPMENT.

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PART OF A LARGER STUDY OF THE COGNITIVE ENVIRONMENTS OF PRESCHOOL CHILDREN, THIS EXPERIMENT EXAMINED THE RELATIONSHIPS BETWEEN MOTHERS' LANGUAGE STYLES AND THE CONCEPT ATTAINMENT OF THEIR PRESCHOOL CHILDREN. SPEECH SAMPLES WERE OBTAINED FROM 160 URBAN NEGRO MOTHERS OF FOUR SOCIOECONOMIC GROUPS (MIDDLE-CLASS, UPPER-LOWER, LOWER-LOWER, AND LOWER-LOWER FAMILIES RECEIVING PUBLIC ASSISTANCE) BY ASKING EACH OF THEM TO TELL HER CHILD A STORY ABOUT THE "LION-MOUSE" CARD OF THE CALIFORNIA ACHIEVEMENT TEST. SAMPLES WERE SCORED ON NINE LANGUAGE SCALES DEVELOPED TO MEASURE VARIOUS DIMENSIONS OF SPEECH COMPLEXITY. MIDDLE-CLASS MOTHERS SCORED HIGHEST ON ALL MEASURES, UPPER-LOWERS NEXT, AND THE TWO LOWER-LOWERS NEXT (PRESUMABLY A REFLECTION ON THEIR SIMILAR EDUCATIONAL BACKGROUND). THE MAJOR DIFFERENCES OCCURRED BETWEEN THE MIDDLE-CLASS MOTHERS AND THE REST OF THE GROUP, WHICH REFLECTS THE HIGHLY ELABORATE LANGUAGE STYLE OF THE MIDDLE-CLASS MOTHERS. CHILDREN'S CONCEPTUAL STYLES WERE THEN MEASURED, AND DATA FROM BOTH STUDIES WERE ANALYZED STATISTICALLY ON THE SIGEL CONCEPTUAL SORTING TASK FOR CHILDREN. THERE WAS A SIGNIFICANT CORRELATION BETWEEN MOTHERS' AND CHILDREN'S SCORES, WHICH INDICATES THAT THE MOTHER'S ABSTRACT LANGUAGE BEHAVIOR HAS A MAJOR EFFECT ON HER CHILD'S DEVELOPMENT OF ABSTRACT CONCEPTUALIZATION. (JG)

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# Maternal Language Styles and Their Implications for Children's Cognitive Development[1] [2]

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In the current concern with the culturally disadvantaged child, investigators at the University of Chicago (Hess & Shipman, 1965) have focussed their attention on maternal variables and their effects on the cognitive development of the urban preschool child. This article deals with one such maternal variable, mothers' language, and its relation to their children's concept attainment.

The indispensable condition of educability today in an advanced society, whether viewed from the standpoint of the needs of society or from a humanistic concern for the individual's self actualization, is the achievement of abstract and conceptual intelligence. To develop his potential, the child must make the transition from manipulating the world of the concrete--an ability the human infant shares with infrahuman animals--to manipulating the world symbolically. Moreover, in an evolving society, the individual must develop an ever-expanding competence in the use of symbols and symbolic processes. Long before formal schooling starts, the child begins to acquire skill in the development of symbolic processes. He manifests his developing skill by his use of bodily movements, gestures, and facial expressions, and

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in his manipulation of materials, colors, sounds, words, and numbers. When referents are attached to these manipulanda, they become the names or signs of things and events. When the names or signs are abstracted from any particular object or event, and designate classes of entities, they become symbols. Signs and symbols are cognitive tools. Of all the symbolic tools, words are the most important, not only because of their unique suitability for communication, but also because verbal language is the most highly developed and flexible medium for performing symbolic operations. Highly abstract symbolic systems, such as mathematics and symbolic logic, are in some respects more efficacious than verbal language, but they are of little importance for cognitive development in the early years precisely because they are too abstract and inflexible as communication systems and as symbolic vehicles for mediating the learning of the kinds of concepts possible of attainment in the early years.

Vygotsky (1962) has held that "the child's intellectual growth is contingent on his mastering the social means of thought, that is, language," and that words are the "linguistic tools of thought." According to Vygotsky, this process starts with a dialogue of speech and gesture between child and parent. Accordingly, one of the most important roles of adults in socializing the child to cognitive behavior is to demarcate the relevant and important dimensions of experience (Vygotsky, 1962; Luria & Yudovich, 1959). From significant adults in his environment, the child learns what is important for him to attend to; how to give order, structure, and meaning to the relevant environmental stimuli; and how to process, both directly and symbolically, the information he attends to. Children "develop and test their notions (hypotheses) chiefly through verbal interaction with more verbally mature speakers" (John & Goldstein, 1964). Hence,

the quality of the feedback from the mother has a powerful influence on the child's acquisition of the cognitive tools which he must begin to master if he is to become educated; the mother's language may facilitate or inhibit the child's cognitive growth.

Different social structures have differential effects on language development. A number of investigators have shown that the structure and level of the language which a child acquires are related to variables associated with social class (Young, 1941; Irwin, 1948; Milner, 1951; Templin, 1957; Anastasi, 1958; John, 1963; Lawton, 1963). Jensen (1965) has summarized the work in this area.

Bernstein, following Sapir (1933) and Whorf (1956), has explicated the view that the language of individuals in a specific social structure not only conditions the kind and level of language that the child will acquire, but also influences his perceptual and conceptual systems (1961). Bernstein has identified two forms of communication codes, or styles of language: restricted and elaborated. Restricted codes are stereotyped, limited, condensed; they lack the specificity needed for precise discrimination, differentiation, and conceptualization. It is the language form often used in impersonal situations when the intent is to promote solidarity or reduce tension. The effect of such codes is to limit the range and complexity of the concepts and information involved. Lower-class individuals tend to be limited to the use of restricted codes, with constrictive cognitive consequences. Elaborated codes, on the other hand, are those in which communication is individualized. The message is specific to a particular situation, person, or topic. Elaborated codes are more differentiated, but also permit of greater generalization of concept and a wider and more complex range of thought. Bernstein (1962a) and Lawton (1963) found that

members of the British middle class are able to use elaborated codes whereas members of the working class tend to be limited to the use of restricted codes. Bernstein (1962b) also found that differences in orientation to linguistic code appear to be independent of intelligence.

On the basis of the foregoing and a preliminary study (Olim, Hess, & Shipman, 1965), the following hypotheses were derived:

1. Mothers who tend to use elaborated language will tend to have children who are superior on a conceptual style sorting task.

2. The mothers' language will be a better predictor of the children's cognitive performance than either the mothers' verbal IQ or the children's IQ.

3. Social class differences will be found in the language styles of the mothers. However, social class level, as such, will not be as significantly predictive of the child's performance as the mothers' language.

## Sample

A research group of 163 Negro mothers and their 4-year old children was selected from four different social status groups: Group A came from college-educated professional, executive, and managerial occupational levels; Group B came from skilled blue-collar occupational levels, with not more than high school education; Group C came from unskilled or semi-skilled occupational levels, with predominantly elementary school education; Group D came from unskilled or semi-skilled occupational levels, with fathers absent and families supported by public assistance (ADC). All groups contain approximately equal numbers of children of either sex.

## Language Measures

As a first step, language scales were selected and developed to measure various aspects of language behavior along the dimension of elaboration-restriction. Following is a description of each scale:

### Mean Sentence Length

One method of obtaining a simple, global measure of language elaboration, which has often been used in studies of language acquisition by children (McCarthy, 1954), is to take the mean sentence length. This measure has been used in the present study also.

The measure has been criticized because of lack of a satisfactory definition of what a sentence is. Traditional grammar definitions, such as that a sentence expresses a complete thought or that a sentence consists of a subject and predicate, are not wholly satisfactory since there remains to be defined what a complete thought is and it is easy to demonstrate the existence of sentences where subject, predicate, or both are missing but understood from the context of the discourse.

One solution is given in phrase-structure grammar where the definition is related to speech. The native speaker of English recognizes sentence division by three kinds of signals: pitch, stress, and juncture (the joinings and pauses in the flow of an utterance). Contrast the following sentences:

1) Had he come earlier, we couldn't have seen him.

2) Had he come earlier? We couldn't have seen him!

If these are read aloud, one can see that the signals that differentiate (1) from (2) are the differences in the patterns of pitch and stress on certain words, and the length of the pause between the two sentences in example (2).

Mean Pre-Verb Length

The mean pre-verb length is the average number of words per clause appearing before the main verb of the clause. Imperative clauses are excluded from the count because by the nature of the imperative construction the main verb usually occurs first, in such instances obviating the possibility of pre-verb elaboration.

In a "kernel" sentence (sentence containing only a simple subject and a verb), the meaning is carried in both the subject and the verb, but usually more of the meaning of the sentence is carried in the predicate than in the subject. Thus, until the main verb is expressed, the major meaning of a sentence usually cannot be ascertained. Miller (1962) has shown that left-recursive sentences are more difficult to recall than right-recursive sentences. The former are those in which a syntactic structure or constituent recurs to the left of the verb. For example, John's friend's father's car is blue, a left-recursive construction, would be more difficult to recall than The car is blue, long, fast, an example of right-recursiveness. Left-recursive clauses have larger mean pre-verb lengths than right-recursive clauses.

The child who must listen to qualification of the subject and qualification of a verb not yet articulated (as when an adverb or adverb phrase precedes the verb) is faced with the necessity of storing more information and decoding more complicated schemata than is the child whose mother typically keeps her subjects unqualified and quickly gets to the main verb of the clause. The contrast may be seen in the following:

1) The child went to the zoo in the morning after breakfast.

2) In the morning after breakfast, the child went to the zoo.

Adjective Range

The general role which adjectives play is to enable the language user to make finer discriminations of expression and comprehension or thought more efficiently. Bernstein (1959, 1961, 1962b) has emphasized the availability of a discriminate range of adjectives to the user of an elaborated code in contrast to the limited range of adjectives available in a restricted code.

The Adjective Range Scale is based on the number of uncommon adjectives, excluding repetitions, divided by the total number of nouns to adjust for length of the protocol. The category, uncommon adjectives, excludes cardinal-numerical, demonstrative, and pronominal possessive adjectives (my, your, his, her, its, our, their); the articles (a, an, the); "other"; and "another."

Adverb Range

The other part of speech especially suited for making qualifications and discriminations efficiently is the adverb. Adverbs have been used by Bernstein (1962b) to distinguish between users of elaborated codes and users of restricted codes.

The Adverb Range Scale is based on the number of uncommon adverbs, excluding repetitions, divided by the total number of verbs, adjectives, and adverbs to adjust for protocol length. The category, uncommon adverbs, excludes "here," there," "now," then," "less," "least," "more," "most," "just," "not," "no," "yes," "how," "when," "where," and "why."

Verb Elaboration

The part of speech that is designed primarily to make predications about the subject of a clause is the verb. Considerable variation in verb form

is a particular characteristic of English. The two devices for achieving variation in verb form are inflection and the use of auxiliary verbs. English verbs are not highly inflected (as compared to Latin and French, for example) and the major method for elaborating verb forms is the use of auxiliary verbs. Also, verbs can be classified functionally along many dimensions so that the same form may serve different functions. When both criteria of classification are used, verbs can be classified into a very large number of different categories. Skilled users of English can generate a large number of different verb forms.

To obtain a measure of verb elaboration, it was decided to count verb forms containing two or more elements in the verb phrase (or stem), excluding repetitions. These are designated complex verb forms. The Verb Elaboration Scale is based on the number of different complex verb forms, divided by the number of sentences to account for protocol length.

Complex Verb Preference

In addition to measuring the magnitude of verb elaboration, it was decided to measure preference for the use of complex verb forms compared to the use of simple (single-word) verb forms. The Complex Verb Preference Scale is derived from the number of complex verb form types divided by the total number of verb form types, both simple and complex.

Syntactic Structure Elaboration

The increase in elaboration and complexity of syntactic structures with language development has long been noted in developmental studies. McCarthy (1954) has summarized the research in this area, which shows that children's syntactic structures become more elaborated and complex with age. Children's language moves from simple sentences to simple sentences with phrases, compound sentences, complex sentences, and compound-complex

sentences still further elaborated, for example, two or more independent units with one or more subordinate clauses (Hahn, 1948). LaBrant (1933) found that the proportion of subordinate clauses to total clauses is an index of language developmental level. Loban (1963) devised a weighted index of subordination in order to achieve a finer-grained measure. Clauses are given increasing weights for increasing degrees of complexity (e.g., clauses modifying other clauses). Lawton (1963) found social class differences among British boys when he used Loban's index. Loban pointed out that an index of subordination is by no means a perfect measure of structural complexity since prepositional phrases, infinitives, appositives, verbals, participial phrases, and other syntactic structures contribute to language complexity.

LaBrant and Loban have held that subordination is a more mature and difficult form of language expression than simply parallel statements connected by and or but (Loban, 1963). For this reason, coordinate clauses were not used by LaBrant and Loban. However, though subordination is generally a higher level form than coordination, this is not always so. John is going but Mary is staying is at least as complex as He said that he is going. The direct object noun clause is in the repertory of individuals at the lowest levels of language development (I tole you I done it).

For the foregoing reasons, the Syntactic Structure Elaboration Scale used in this study includes more types of syntactic structures than Loban used. The scale is based on the number of complex syntactic structures weighted for complexity[1] and divided by the number of sentences to account for protocol length. Complex syntactic structures include (1) coordinate

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[1]The system of weighting appears in a coding manual, which is obtainable from the authors upon request.

clauses; (2) subordinate clauses; (3) infinitive clauses; (4) sentence-modifying infinitive phrases (as distinguished from noun-modifying infinitive phrases); infinitive phrases appearing in structures of complementation; and sentence-modifying participial phrases.

Stimulus Utilization

The Stimulus Utilization Scale was devised for use with projective tests. A stimulus utilization score consists of the number of characters (including parts of characters) and objects present in the projective test picture which the testee uses in the story he makes up. This scale is designed to tap a different kind of language-related behavior from the behaviors measured by the preceding scales. The latter are syntactic scales. The Stimulus Utilization Scale measures the subject's span of attention, and his tendency to make perceptual discriminations in his environment, to recognize the salience of certain types of stimuli, and to relate them to one another.

Introduced Content

The Introduced Content Scale was also devised for use with projective tests. The introduced content score consists of the number of characters (including parts of characters) and objects not present in the projective test picture but introduced by the testee in the story he makes up. The tendency to go beyond the stimuli present in the picture seems to be related to imaginative thought elaboration (Henry, 1956). The scale appears to measure the extent to which a person sees the possibilities for utilizing language as a means for cognitive elaboration of his inner life.

Abstraction

The Abstraction Scale was developed in order to obtain a measure of the extent to which an individual uses language to express abstract concepts.

The importance of abstraction behavior as a measure of cognitive attitude and level has been so long recognized that the point needs little exposition here. In clinical psychiatry the distinction between abstract and concrete attitudes has been useful (Goldstein & Scheerer, 1941; Hanfmann & Kasanin, 1942; Rapaport, 1945). Concept formation and attainment studies have been devoted largely to studying how individuals achieve abstract levels of conceptualization. A number of test items in the Stanford-Binet request definition of abstract words and concepts (though, in fact, the words used tend to be not so much abstract as words of low frequency). Many other questions on intelligence tests are presumed to tap the ability of the testee to engage in abstract thinking (for example, the Similarities sub-test of the WAIS).

Concrete thinking is characterized by adherence to immediate experience of objects, situations, or events. It has been shown that the nouns used by young English-speaking children are more reliably the names of things and verbs more reliably the names of actions than is the case for the nouns and verbs used by English-speaking adults, who tend to use more abstract nouns and verbs (Brown, 1957). In abstract thinking, the individual goes beyond the immediate properties or attributes of the object, situation, or event and attends to inferred or abstracted attributes.

This distinction between concrete and abstract thinking provides a better criterion for classifying words as either concrete or abstract than dictionary and traditional grammar book definitions since words apart from context are neither concrete nor abstract. For example, Webster cites poem as a concrete noun and poetry as an abstract noun. Yet, when we say that the poem is a form of writing, we are using poem as an abstract noun

and when we speak of Keats' poetry (meaning his poems), we are using poetry as a concrete noun. The distinction between whether a word is concrete or abstract lies in the proposition being expressed. For the Abstraction Scale, nouns and verbs were classified in accordance with this criterion. The Abstraction Scale is based on the number of abstract nouns and verbs, excluding forms of be and excluding repetitions, divided by the total nouns and verbs, including concrete nouns and verbs, but excluding forms of be and repetitions.

Language Elaboration

There was a presumption that four scales, Mean Sentence Length, Mean Pre-Verb Length, Verb Elaboration, and Syntactic Structure Elaboration, overlapped somewhat in what they were measuring. Accordingly, a principal components analysis was made of these four scales across three different samples of each mother's speech. The first principal component was used in subsequent regression analyses in place of the four scales comprising language elaboration. A principal components analysis of all the scales showed that the scales not loaded with language elaboration were independent of one another. These other scales were therefore included as separate variables in the regression analyses.

It should be noted that the language scales do not measure grammatical correctness. Implicit in the study was the desire to measure code and cognitive complexity and elaboration. Although there is a correlation between language elaboration and grammatical correctness (since both are a function of education), there is no necessary relationship between the two. "I done it" is cognitively and semantically equivalent to "I did it." It may also be noted that no attempt was made to measure differences in

the quality or level of the rhetoric in the speech samples since, again, there is no necessary relationship between literary quality and cognitive level.

## Data-Gathering Procedure

For the language style analyses, three samples of the mother's speech were obtained. In the home, she was asked by the interviewer to describe a typical day in her life. One purpose of this task was to provide a sample of the mother's speech to an adult in an open-ended situation. The mother was also given two projective tests. In one, she was presented with a photograph of a mother and a teacher in a class room and was asked to tell what might be going on in the picture. In the other, she was presented with Card No. 3, the "lion-mouse" card of the Children's Apperception Test (CAT), and was requested to tell a story about the picture to her child, who was present. The instructions were standard TAT instructions. The mother-teacher protocol provided another sample of the mother's speech to an adult and the CAT protocol provided a specimen of the mother's speech to her child. All interviews were tape-recorded.

## Cognitive Measures of the Children

To obtain measures of the cognitive level and style of each child, three tasks were used. The Stanford-Binet (Form L-M) was used to assess level. The Sigel Conceptual Sorting Task for Children (Sigel, 1963) was used for conceptual style assessment. An 8-block sorting task was used to measure the child's ability to learn a concept (taught by his mother) and to use it correctly in a transfer task.

In the Sigel task, the child is requested to select one of three pictures that is like, or goes with, a presentation picture. There are 20 sets of pictures, with a separate presentation picture for each set, so that the child is asked to make 20 selections. The child is asked to state the reason for his selection. Verbal responses are scored on the basis of the kind of concept expressed. When a child gives a correct verbal tag to a conceptual category, he demonstrates both that he has the concept in his repertoire and that he can verbalize it. It is extremely unlikely that a child could verbalize a concept without having a grasp of the underlying, nonlinguistic concept (Brown, 1956). Thus, the task does measure the presence of conceptual categories in the child. However, the converse is not necessarily true, namely, that the child who cannot verbalize the category does not have the category in his cognitive repertoire. A number of the children in the study made sorts which evidenced that they were using a conceptual basis for the responses, but the responses were not scorable because of ambiguity, or lack, of verbalization. For children at the age level and with the backgrounds of the children in this project, a non-verbal cognitive sorting task would probably have been additionally useful.

Because a large number of children were unable to give scorable responses, additional scoring categories were developed to cover that contingency. Following is a brief description of the response categories:

Descriptive Analytic (or Part-Whole)--Concepts based on one of the manifest physical attributes of the paired pictures, such as color (black and white only), texture, shading, shape, or size, and selections based on individual items or parts of figures in the pictures, such as guns, wheels, heads.

Descriptive Global--Concepts based on some manifest global attribute, such as the status or occupation of the figures (policemen, soldiers, nurses, trucks); discrete age categories (children, adults, babies); sex (males, females); and age and sex (young women, boys, girls).

Relational-Contextual--Concepts indicating an interdependence among two or more stimuli, the interdependence being functional, temporal, or spatial, e.g., "the horse pulls the stagecoach," "the man is shooting the other man dead."

Categorical-Inferential--Concepts based on inferred or non-observable characteristics of the paired stimuli. Each member of the pair is representative of the total class and each instance is not interdependent, e.g., "these are sick people," "they are good."

Nonscorable Verbal Responses--Verbal responses the scorer could not place in one of the foregoing categories because the response was unclear, ambiguous, irrelevant, or the like.

Nonverbal Responses--Selections where the child gave no reply to the examiner's question regarding the basis of the selection, simply pointed at the pictures, or said "don't know" or "this . . . that."

Non-sorts--Instances where the child refused to do the task and instances in which the child failed to make a selection.

In the 8-block sorting task, the mother had to teach her child to use two criteria of classification simultaneously in sorting Vygotsky-type blocks, grouping blocks of the same height (tall or short) and marked with the same mark (x or o), ignoring shape and color. The child then had to explain the reason for his grouping on a test task. His verbal score indicates that he has attained the concept (i.e., he can sort using the two criteria) and measures also the extent to which he can state the

rationale for his sort.

## Results

### Social Class Comparisons

One objective of the study was to test the hypothesis that there would be major social class differences in language usage. Table 1 presents a comparison of the means, for each language scale, of the four social status groups, with three speech samples. There is a decided social class trend with the middle-class mothers usually the highest, the upper-lower mothers next, and the two lower-lower groups lowest. An unexpected reversal occurred in the introduced content scores with the mother-teacher protocols. A detailed analysis of the protocols disclosed two reasons for this result. First, the middle-class mother tended to limit the introduction of characters and objects in this task because of her superiority in abstract attitude. When she saw the situation (in the mother-teacher picture) as problematic, she was likely to state that perhaps the child had a "behavior problem," and to stop with that generalization. The lower-class mother, on the other hand, was more likely to say that perhaps the child hit another child (introduced character) or failed to do her homework (introduced object). Unable to generalize the situation, she resorted to explicit spelling out of what she meant. Second, the situation of a mother and a teacher conversing in a classroom is not a stimulus that especially aroused the middle-class mother whereas the lower-class mother was likely to perceive the situation as one in which the mother's child got into trouble, and trouble seems to have elicited more story elaboration. By way of contrast, in the lion-mouse stories, the middle-class mothers, who typically read and tell fanciful stories to their children, had the highest introduced content scores whereas the lower-lower class mothers had the lowest scores.

Table 1

Social Status Differences in Mean Language Scores

| Scale | CAT Speech Sample | | | |
|---|---|---|---|---|
| | Middle | Upper-Lower | Lower-Lower | ADC |
| Stimulus Utilization | 5.82 | 4.81 | 4.95 | 5.37 |
| Introduced Content | 3.75 | 2.62 | 2.51 | 2.34 |
| Abstraction | 5.60 | 4.89 | 3.46 | 1.75 |
| Adjective Range | 32.81 | 29.00 | 32.14 | 31.26 |
| Adverb Range | 11.14 | 9.41 | 8.58 | 8.22 |
| Complex Verb Preference | 63.25 | 60.48 | 49.80 | 51.07 |
| Verb Elaboration | .59 | .52 | .48 | .44 |
| Mean Sentence Length | 11.39 | 8.74 | 8.35 | 8.42 |
| Mean Pre-Verb Length | 2.52 | 2.19 | 2.00 | 2.09 |
| Syntactic Structure Elab. | 1.07 | .70 | .52 | .55 |
| Language Elaboration[a] | 71.30 | 51.38 | 39.28 | 37.02 |

[a]Scores were derived from a principal components analysis of Verb Elaboration, Mean Sentence Length, Mean Pre-Verb Length, and Syntactic Structure Elaboration across all three speech samples. Scores have been converted from z scores to T scores for ease of reference.

[b]Abstraction behavior was not elicited sufficiently by this task to warrant scoring.

[c]Since this is not a projective test, there are no scores for Stimulus Utilization and Introduced Content.

Table 1--Continued

| Mother-Teacher Speech Sample | | | | Typical Day Speech Sample | | | |
|---|---|---|---|---|---|---|---|
| Middle | Upper-Lower | Lower-Lower | ADC | Middle | Upper-Lower | Lower-Lower | ADC |
| 3.00 | 2.75 | 2.72 | 2.47 | c | c | c | c |
| 1.31 | 1.78 | 1.81 | 1.59 | c | c | c | c |
| b | b | b | b | b | b | b | b |
| 25.09 | 25.41 | 20.05 | 20.00 | 25.80 | 19.45 | 20.96 | 20.00 |
| 11.53 | 10.81 | 7.03 | 9.65 | 11.23 | 10.44 | 10.86 | 13.05 |
| 62.81 | 59.72 | 56.25 | 58.32 | 54.92 | 49.73 | 47.70 | 38.00 |
| 1.36 | 1.23 | 1.01 | .88 | .48 | .32 | .30 | .23 |
| 19.32 | 16.33 | 14.22 | 13.20 | 13.96 | 11.12 | 10.55 | 9.90 |
| 3.09 | 3.38 | 2.79 | 2.75 | 2.23 | 2.12 | 2.09 | 2.07 |
| 2.12 | 2.04 | 1.56 | 1.49 | 1.31 | .95 | .84 | .74 |

In the typical day protocols, another unexpected reversal occurred where the ADC mothers were highest in adverb range. This appears to be an artifact. The adverb scores are derived by dividing the number of uncommon adverb types by the total verbs, adjectives, and adverbs. For some reason, the number of verbs, adjectives, and adverbs used by the ADC mothers was disproportionately low in the typical day accounts, thereby producing artificially inflated ratios. (This is a risk one takes in using ratio scales to account for protocol length.)

## Mann-Whitney Test Comparisons

A more precise comparison of the four groups was afforded by the Mann-Whitney Test, as shown in Table 2. Instead of comparing means, this test compares the relative location of the distribution of two groups on a common scale. As may be seen from Table 2, some of the scales show dramatic differences between the middle-class mothers and the other three groups. In some instances, too, the upper-lower mothers were significantly superior to the two lower-lower class groups. Except in the typical day speech samples, the Adjective Range scores did not discriminate the groups at statistically significant levels. Also, the Mann-Whitney comparison for the two unexpected results previously reported (Adverb Range and Introduced Content) corroborated the results obtained with respect to the group means.

## Maternal Language Styles and Children's Cognitive Behavior

What are the implications of maternal language differences for the preschool children of these mothers? Is there any warrant for assuming that the mothers' language differences, which showed up so clearly in social class comparisons, are related to their children's cognitive

Table 2

Social Status Differences in Mothers' Language Scores (Mann-Whitney Test)

| | Significance Levels Exceeded[a] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MSL | MPVL | VE | CVP | SSE | Adj. | Adv. | SU | IC | Abs. |
| CAT Speech Sample: | | | | | | | | | | |
| Middle vs. Upper-Lower | .001 | .01 | .05 | n.s. | .01 | n.s. | n.s. | .05 | n.s. | n.s. |
| Middle vs. Lower-Lower | .001 | .001 | .05 | .001 | .001 | n.s. | .05 | n.s. | .05 | .05 |
| Middle vs. ADC | .001 | .001 | .01 | .001 | .001 | n.s. | .01 | n.s. | .05 | .01 |
| Upper-Lower vs. Lower-Lower | n.s. | .05 | n.s. | .01 | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. |
| Upper-Lower vs. ADC | n.s. | n.s. | n.s. | .01 | n.s. | n.s. | n.s. | n.s. | n.s. | .05 |
| Lower-Lower vs. ADC | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. |
| Mother-Teacher Sample: | | | | | | | | | | |
| Middle vs. Upper-Lower | .01 | n.s. | n.s. | .05 | n.s. | n.s. | n.s. | .05 | n.s. | d |
| Middle vs. Lower-Lower | .001 | .05 | .05 | .01 | .05 | n.s. | .05 | n.s. | .05[bc] | d |
| Middle vs. ADC | .001 | n.s. | .001 | n.s. | .01 | n.s. | n.s. | .05 | .05[bc] | d |
| Upper-Lower vs. Lower-Lower | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | d |
| Upper-Lower vs. ADC | .05 | n.s. | .05 | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | d |
| Lower-Lower vs. ADC | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | .01[b] | n.s. | n.s. | d |
| Typical-Day Sample: | | | | | | | | | | |
| Middle vs. Upper-Lower | .001 | n.s. | .01 | n.s. | .01 | .01 | n.s. | d | d | d |
| Middle vs. Lower-Lower | .001 | .05 | .01 | .05 | .01 | .05 | n.s. | d | d | d |
| Middle vs. ADC | .001 | .05 | .001 | .001 | .001 | .05 | .05[b] | d | d | d |
| Upper-Lower vs. Lower-Lower | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | d | d | d |
| Upper-Lower vs. ADC | n.s. | n.s. | n.s. | .01 | .05 | n.s. | .001[b] | d | d | d |
| Lower-Lower vs. ADC | n.s. | n.s. | n.s. | .05 | n.s. | n.s. | .01[b] | d | d | d |

[a]Except for the comparison between the lower-lowers and the ADC, all tests were one-tailed since the direction was predicted.

[b]The second group exceeded the first group.

[c]A two-tailed test was used since the direction was not predicted.

[d]Scale not applicable.

development? To provide information on this question, a series of regression analyses was undertaken. The criterion, or dependent, variables selected were the child's intellectual competence level, as measured by the Stanford-Binet (Form L-M), responses to the Sigel Conceptual Sorting Task for Children (Sigel, 1963), and verbal scores on the 8-block sorting task. The predictor, or independent, variables were the following mothers' language scores: language elaboration (principal component factor scores), stimulus utilization, introduced content, adjective range, and adverb range; the mothers' WAIS verbal IQs; social class level; and the children's IQs (except when they were used as a criterion variable). IQs and social class level were included because of their presumed relevance to the children's cognitive behavior. All the language scores, except language elaboration, were based on only the CAT protocols because the scales were either inapplicable to the other two speech tasks or were of insufficient reliability.

In the following tables, only those predictor variables are presented which produced some significant partial correlations with the criterion variable when the influence of all other predictor variables was partialed out. or which elucidate analysis of the findings.

Child's IQ

The only variable significantly correlated with the children's IQs was the mothers' WAIS verbal IQ (Table 3). The correlations were much higher with the girls' IQs than with the boys', both for the total sample and for the combined three lower-class groups. The differential sex finding is consistent with that of Kagan and Moss (1959), who found that the correlation between young children's IQs and their mothers' IQs tends to be considerably higher for girls than for boys. The correlation with the lower-class children was highly significant, but was negligible in the case of middle-class children. However, the lack of middle-class correlation could be attributable to the restricted range and small size of the group (N = 40).

Table 3

Partial Correlations of Mothers' IQs With

Children's Stanford-Binet IQs

| Variable | Total | Boys | Girls | Middle Class | Lower Class | Lower Class | |
|---|---|---|---|---|---|---|---|
| | | | | | | Boys | Girls |
| df = | 1/154 | 1/72 | 1/73 | 1/32 | 1/115 | 1/53 | 1/54 |
| WAIS Verbal IQs | .31*** | .15 | .39*** | .07 | .38*** | .21 | .45*** |

***p < .001

Categorical-Inferential Responses

Turning now to the children's conceptual style responses, the most striking and clear-cut results occurred with regard to the relationship between the mothers' language abstraction and the children's cognitive abstraction as measured by their categorical-inferential responses in the Sigel task (Table 4). The mothers' and children's abstraction scores were significantly correlated ($r = .25$, $p < .01$) for the total sample, a finding consistent with an earlier study of a sub-sample of 54 (Olim, Hess, & Shipman, 1965a; Olim et al., 1965b). In examining the correlations within each social status group, it was found that only in the middle class was there a statistically significant relationship ($r = .49$, $p < .01$). It will be recalled that the middle-class mothers were significantly superior to the two lower-lower groups in their use of abstract language (Table 2). In the children's conceptual style task, the middle-class children made more categorical-inferential responses than the other children (Table 5) and a higher percentage of middle-class children made categorical-inferential responses (Table 6) (Hess & Shipman, 1965).

Table 4

Partial Correlations of Mothers' Language, IQs, and Social Status Level With Children's Categorical-Inferential Responses

| Variables | Total | Boys | Girls | Middle Class | Lower Class | Lower Class Boys | Lower Class Girls |
|---|---|---|---|---|---|---|---|
| df = | 1/153 | 1/71 | 1/72 | 1/31 | 1/114 | 1/52 | 1/53 |
| Mothers' Abstraction | .25** | .34** | .16 | .49** | .10 | .04 | .12 |
| Children's IQs | .12 | .12 | .04 | -.02 | .14 | .30* | .02 |
| Mothers' Verbal IQs | -.06 | -.18 | .02 | -.30 | -.02 | -.16 | .05 |
| Social Status Level | .07 | .19 | -.05 | -- | -- | -- | -- |

*p < .05
**p < .01

Table 5

Social Status Differences in Children's Mean Responses to Sigel Sorting Task

| Category | Middle | Upper-Lower | Lower-Lower | ADC |
|---|---|---|---|---|
| Relational-Contextual | 3.18 | 2.22 | 1.18 | 1.02 |
| Descriptive Global | 2.80 | 2.30 | 1.51 | .98 |
| Descriptive Analytic | 2.25 | .65 | .20 | .34 |
| Categorical-Inferential | 2.02 | 1.35 | 1.18 | .61 |

Table 6

Social Status Differences in Percentage of Children Responding In Each Conceptual Style Category

| Category | Middle | Upper-Lower | Lower-Lower | ADC |
|---|---|---|---|---|
| Relational-Contextual | 77.5 | 65.0 | 41.0 | 43.9 |
| Descriptive Global | 70.0 | 55.0 | 53.8 | 31.7 |
| Descriptive Analytic | 40.0 | 25.0 | 18.0 | 14.6 |
| Categorical-Inferential | 52.5 | 42.5 | 30.8 | 24.4 |

When we look at the sex of the children, we find that the abstraction correlation appears to have greater relevance to boys than to girls. The boys' abstraction behavior was significantly correlated with the mothers' language abstraction ($r = .34$, $p < .01$), but not with the girls'--a result consistent with the general research finding that boys tend to manifest abstraction behavior earlier than girls.

It is of interest, also, that it was not the mother's abstraction ability but her abstract language behavior that was related to the child's cognitive abstraction. Table 4 shows that the mother's IQ did not contribute significantly to the correlation. If we look at the relationship between the mothers' IQs and their language abstraction (Table 7), we see why this is so. In Table 7, the results are given of the correlation between the mothers' language abstraction scores and their verbal IQ and Similarities sub-test scores. The latter sub-test was included because it is the sub-test of the WAIS that specifically measures abstract conceptualizing ability. The correlations between the WAIS Similarities scores and language abstraction

Table 7

Partial Correlations of Mothers' IQs and Language Abstraction

| Language Abstraction vs. | df = | Total 1/149 | Middle 1/36 | Upper-Lower 1/33 | Lower-Lower 1/34 | ADC 1/34 |
|---|---|---|---|---|---|---|
| WAIS Verbal IQ | | .06 | .00 | .34* | .00 | .36* |
| WAIS Similarities | | .05 | .12 | -.16 | .00 | .00 |

*$p < .05$

were insignificant. The mothers' verbal IQs were significantly correlated with their language in the case of the upper-lowers ($r = .34$, $p < .05$) and the ADC group ($r = .36$, $p < .05$), but we have previously seen that the IQs of mothers in the lower status groups were not related to the children's abstraction behavior (Table 4).

The child's IQ seems to have had some effect upon his tendency to make categorical-inferential responses, but primarily in the case of the lower-class boys ($r = .30$, $p < .05$, Table 4).

8-Block Verbal Scores

When we examine the children's 8-block verbal scores (Table 8), which represent the children's attainment of an abstract concept, again we find that the mothers' language abstraction scores were significantly correlated for the total sample ($r = .16$, $p < .05$) and for the boys ($r = .25$, $p < .05$). In this case, however, the significant relationship was with the lower-class boys ($r = .28$, $p < .05$) rather than with the middle class. The children's IQs were also significantly related to their 8-block performance for the total sample ($r = .28$, $p < .001$); for the boys ($r = .45$, $p < .001$);

for the lower-class children ($r = .20$, $p < .05$); and for the lower-class boys ($r = .37$, $p < .001$). In this task, the mothers' verbal IQs were a significant variable in the case of the lower-class children ($r = .23$, $p < .05$); the total sample of girls ($r = .25$, $p < .05$); and the lower-class girls ($r = .37$, $p < .05$). The mother-daughter IQ correlation previously noted (Table 3) seems to have manifested itself in this task also.

Table 8

Partial Correlations of Mothers' Language, IQs, and Social Status Level With Children's 8-Block Verbal Scores

| Variables | Total | Boys | Girls | Middle Class | Lower Class | Lower Class Boys | Lower Class Girls |
|---|---|---|---|---|---|---|---|
| df = | 1/153 | 1/71 | 1/72 | 1/31 | 1/114 | 1/52 | 1/53 |
| Mothers' Abstraction | .16* | .25* | .03 | -.04 | .21* | .28* | .05 |
| Children's IQs | .28*** | .45*** | .03 | .33 | .20* | .37*** | -.04 |
| Mothers' Verbal IQs | .15 | .09 | .25* | -.12 | .23* | .20 | .37*** |
| Social Status Level | .06 | .05 | .06 | -- | -- | -- | -- |

*$p < .05$
**$p < .01$
***$p < .001$

Other Conceptual Style Responses

As shown in Table 9, only one predictor variable was significantly correlated with the children's relational-contextual responses, namely, the mothers' language elaboration scores ($r = .17$, $p < .05$). In the case of descriptive global responses, the mothers' stimulus utilization scores were negatively correlated for the total sample ($r = -.16$, $p < .05$); for the girls ($r = -.28$, $p < .05$); and for the middle-class children ($r = -.37$,

Table 9

Partial Correlations of Mothers' Language, Children's IQs, and Social Status Level With Children's Conceptual Style Responses

| Variables | Total | Boys | Girls | Middle Class | Lower Class | Lower Class | |
|---|---|---|---|---|---|---|---|
| | | | | | | Boys | Girls |
| df = | 1/153 | 1/71 | 1/72 | 1/31 | 1/114 | 1/52 | 1/53 |
| **Relational-Contextual Responses:** | | | | | | | |
| Language Elaboration | .17* | .18 | .16 | .21 | .16 | .09 | .26 |
| **Descriptive Global Responses:** | | | | | | | |
| Stimulus Utilization | -.16* | -.02 | -.28* | -.37* | -.04 | .12 | -.17 |
| Introduced Content | .08 | -.01 | .20 | .44* | -.05 | -.22 | .12 |
| Child's IQ | .17* | .25* | .06 | .30 | .21* | .28* | .13 |
| Social Status Level | .15 | .07 | .24* | -- | -- | -- | -- |
| **Descriptive Analytic Responses:** | | | | | | | |
| Child's IQ | .27*** | .52*** | .10 | .39* | .21* | .23 | .25 |
| Social Status Level | .14 | -.02 | .23* | | | | |

*p ⩽ .05
**p ⩽ .01
***p ⩽ .001

$p < .05$). It seems that the middle-class mother who is low in attention to important stimuli in a projective test picture tends to have a child who inclines toward diffuse, global responses, particularly in the case of girls. For the middle class only, the mothers' introduced content scores were positively related to the children's descriptive global responses ($r = .44$, $p < .05$), and this relationship was applicable to the girls, not the boys (the correlation was negligible for the total sample of boys and negative for the lower-class boys). It may be that the mother who tends to introduce content in her fanciful stories encourages her child (especially when the child is a girl) to engage in global, naming behavior. It may be noted that the opposing direction of the signs of the stimulus utilization and introduced content scores was not a function of the mothers' behavior since analysis of the middle-class mothers' language scores for these two scales revealed that they were not correlated.

The children's IQs were significantly related to their descriptive global responses for the total sample ($r = .17$, $p < .05$); for the boys ($r = .25$, $p < .05$); for the lower-class children ($r = .21$, $p < .05$); and for the lower-class boys ($r = .28$, $p < .05$). As was the case with the categorical-inferential and the relational-contextual responses, the mothers' verbal IQs were not a significant factor in their children's descriptive global responses. Social status level was significant only in the case of the girls ($r = .24$, $p < .05$).

None of the maternal language variables was significant with respect to the children's descriptive analytic responses. Here, the children's IQs were significant--for the total sample ($r = .27$, $p < .001$); for the boys ($r = .52$, $p < .001$); for the middle class ($r = .39$, $p < .05$); and for the lower-class children ($r = .21$, $p < .05$); but not for the girls.

As in the case of descriptive global responses, social status level was significant with respect to the girls ($r = .23$, $p < .05$).

Children's Non-Verbal Responses and Non-Sorts

There was a significant tendency for children who performed the conceptual sorting task but who were unable to verbalize the basis for the sort to be low in IQ (Table 10). Similarly, a significantly negative relationship was found between the children's IQs and their refusal or inability to make conceptual sorts (Table 10). None of the other predictor variables were significant. In cases where the children were unable to verbalize their responses but the responses could not be scored, there was some tendency for mothers and children to be high in IQ, but the social status level relationship was negative (Table 10). This suggests the possibility that these children were in a transitional "pre-verbal" phase of development.

## Discussion

The major question to which this study addressed itself is whether or not there is any relationship between the mothers' language and their preschool children's cognitive development. Assuming such a relationship were to be found, could it be explained on the grounds that the significant factors in the relationship are the mothers' IQs or the children's IQs or "social class"? It is, of course, well known (and this research also confirmed it) that the middle-class mothers and children have the highest average IQs and that the means progressively decrease with social status level. The method of choice for attacking this question was multiple and

Table 10

Partial Correlations of IQs and Social Status Level With Children's Non-Performance On Conceptual Style Sorting Task

| | Total | Boys | Girls | Middle Class | Lower Class | Lower Class | |
|---|---|---|---|---|---|---|---|
| | | | | | | Boys | Girls |
| | 1/153 | 1/71 | 1/72 | 1/31 | 1/114 | 1/52 | 1/53 |
| **Nonverbal Sorts:** | | | | | | | |
| Child's IQ | -.30*** | -.28* | -.29* | -.35* | -.30** | -.31* | -.30* |
| **Non-Sorts:** | | | | | | | |
| Child's IQ | -.18* | -.28* | -.15 | -.18 | -.21* | -.34* | -.03 |
| **Nonscorable Sorts:** | | | | | | | |
| Child's IQ | .14 | .16 | .11 | -.03 | .21* | .26 | .15 |
| Mother's IQ | .21** | .20 | .20 | .28 | .13 | -.02 | .18 |
| Social Status Level | -.22** | -.26* | -.20 | -- | -- | -- | -- |

*p < .05
**p < .01
***p < .001

partial correlation so that one could determine the influence of IQ and social status level when the influence of other variables was controlled for. When this method was employed, a number of interesting results emerged.

In the first place, social class level turned out to be a major predictor variable only in the case of the girls' descriptive part analytic and descriptive global responses and in the case of responses that were too ambiguous to be scored. We have previously observed that there were large social class differences in maternal language styles. Furthermore, we have seen that there were marked differences by social class in the children's responses to the Sigel conceptual style task. Yet, when other variables are controlled for, social class appears to be of only limited relevance as a predictor except on a broad group basis. This supports the view that social class is an umbrella variable, which in simple correlations often masks the effect of covert variables associated with social class status.

Secondly, the child's own IQ was an important positive factor with respect to descriptive global and descriptive analytic responses, and with regard to 8-block verbal scores; and negatively related to ability to perform the Sigel task. However, in these instances maternal language variables were also significant. Because of the contribution of various maternal language variables, one cannot conclude that the child's IQ "explains" his conceptual style responses. Furthermore, it was negligible with respect to the other two conceptual style categories. However, in the case of children who could not or did not explain their sorts verbally or make cognitive sorts, the only significant factor was the child's low IQ. In the case of non-performance, therefore, it seems reasonable to conclude that the child's low IQ was the major factor.

The mothers' verbal IQ was a significant and major predictor of only two criterion variables: the children's IQ and their 8-block performance. It is noteworthy that although the mother's IQ contributed to the success of her child in a concept attainment task where the mother had to teach the concept to her child, her IQ was not related to the child's behavior in a cognitive sorting task designed to measure the child's existing repertoire of potential responses. The mother's language, on the other hand, was a major predictor of the child's performance on both tasks. It will be recalled that in the case of abstract categorizing only the mother's abstract language was a significant and major predictor of the child's performance.

## Conclusion

Perhaps one of the most positive results of the research is that a beginning has been made at discovering the precise language mechanisms which mediate between cultural experience and cognitive behavior and development. It seems clear, from the study, that language does play an important role in the socialization of cognitive behavior. A good example of this was the previously mentioned finding with respect to abstract conceptualization, where it was found that neither the mother's abstraction ability, her general verbal intelligence, nor the child's IQ was significantly related to the child's performance. Only the mother's language abstraction was significantly correlated. Furthermore, the relationship occurred primarily with respect to the middle class. One important inference to be drawn from these results is the possibility that there is an abstraction factor in the middle-class mother's language which may have far-reaching implications for the subsequent intellectual development of the child. We know that as one proceeds up the educational ladder, school subjects

and $I_Q$ tests tend more and more to measure verbal abstraction ability. It may be that the seeds of this ability are planted during the child's pre-school years. The research tends to support the hypothesis that it is the verbal environment of the typical middle-class home that is the major contributor to the child's starting on the road to abstraction behavior of a high order. Conversely, the very absence of this kind of verbal environment appears to be creating an enormous deficit in the potential educability of the lower-class child.

The study showed that large, sometimes dramatic, differences exist among the social class groups, with a clear social class level trend. The middle-class mothers were consistently the highest on all scales and tasks (with the exception only of introduced content in the mother-teacher protocols), the upper-lower mothers generally coming next, and the two lower-lower class groups usually scoring the lowest. The middle-class mothers talked in longer sentences, exhibited a wider range of adverbs, manifested a larger repertoire of complex verb types, used more complex syntactic structures, exhibited greater perceptual discrimination as shown by their attending to more of the stimuli in test pictures, displayed more abstract concepts in their language usage, and in the case of the fanciful story told to the child, showed more imaginative thought elaboration by going beyond the information given in the test picture and introducing characters and objects not manifest in the lion-mouse picture. However, with respect to the mother-teacher test picture, the lower-class mothers were significantly higher than the middle-class mothers in introduced content. It was concluded that although this was in part due to the inferiority of the lower-class groups in describing a situation in generalized terms, nevertheless another factor appeared to be present, namely, that if the task is stimulating enough to

lower-class individuals, they show that they, too, are able to go beyond the information immediately given; that they are not necessarily stimulus bound.

With the one exception just noted, the lower-class mothers showed a general picture of language restriction--a restriction that became greater with lowered social class level. The lower-class groups consistently spoke in shorter sentences; demonstrated a narrower range of linguistic subtlety and elaboration, as evidenced by their smaller repertoires of adverb and complex verb types and their tendency to use simpler syntactic structures; exhibited a more constricted perceptual system, as shown by their lowered attention to the stimuli in test pictures; displayed a marked inability to use abstract concepts; and evidenced a deficit in the area of imaginative thought elaboration when asked to fabricate a fanciful story.

The study suggests that perhaps one effective method for enhancing the cognitive development of the culturally disadvantaged child is to take steps in the preschool years to expand his linguistic environment and to encourage him to see the value, intrinsic as well as extrinsic, of using language as a cognitive tool. It may be that the greater disadvantage for the culturally disadvantaged child is not that he is economically deprived, but that he is denied the opportunity to experience the power and the excitement that come with the development of symbol-using competence.

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